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10/040,717	01/07/2002	Wolfgang Singer	637.0016USU	1778

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EXAMINER

HO, ALLEN C

ART UNIT	PAPER NUMBER
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2882

MAIL DATE	DELIVERY MODE
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10/29/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/040,717

Applicant(s)

SINGER ET AL.

Examiner

Allen C. Ho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-16, 19-21, 24-26 and 28-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3-8, 12 and 14-16 is/are allowed.
- 6) ☒ Claim(s) 9-11, 13, 21, 25, 26 and 28-30 is/are rejected.
- 7) ☒ Claim(s) 19, 20 and 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 20 and 24 are objected to because of the following informalities:
Claim 20, line 16, "first raster element" should be replaced by --raster elements--.
Appropriate correction is required.
2. Claims 21 and 25 are objected to because of the following informalities:
Claim 21, line 15, "first raster element" should be replaced by --raster elements--.
Appropriate correction is required.
3. Claim 26 is objected to because of the following informalities:
Claim 26, line 15, "first raster element" should be replaced by --raster elements--.
Appropriate correction is required.
4. Claim 28 is objected to because of the following informalities:
Claim 28 recites the limitation "said light" in line 4. There is insufficient antecedent basis for this limitation in the claim.
Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 9-11, 13, and 28-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanaka *et al.* (U. S. Patent No. 6,057,899).

With regard to claim 9, Tanaka *et al.* disclosed an illumination system that comprises: a first optical element (103), which is divided into first raster elements (109) and lies in a first plane, wherein the first raster elements each has an x-dimension and a y-dimension with an aspect ratio, wherein at least two of the first raster elements (109A or 109B, 109) have aspect ratio of different magnitudes (column 8, lines 11-19), wherein the first raster elements are arranged on a support structure in a plurality of rows, wherein at least one of the plurality of rows includes at least two of the first raster elements, and wherein the illumination system produces a two-dimensional image of the first raster elements in an object plane.

With regard to claim 10, Tanaka *et al.* disclosed the illumination system according to claim 9, the illumination system further comprises a collector unit (102), which illuminates the first plane with the first raster elements.

With regard to claim 11, Tanaka *et al.* disclosed the illumination system according to claim 9, the illumination system further comprises at least one field mirror (102).

With regard to claim 13, Tanaka *et al.* disclosed the illumination system according to claim 9, wherein the first raster elements are rectangular (column 8, lines 11-19).

With regard to claim 28, Tanaka *et al.* disclosed the illumination system according to claim 9, the illumination system further comprises a source of light (101), wherein the first raster

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elements are arranged on the support structure in an area that is illuminated by the light source, and wherein the first raster elements cover at least 95% of the area (Fig. 4).

With regard to claim 29, Tanaka *et al.* disclosed the illumination system according to claim 9, wherein the at least two of the first raster elements having aspect ratio of different magnitudes have x-dimensions (longitudinal sides) that are substantially equal, and y-dimensions (lateral sides) that are different (column 8, lines 11-19).

With regard to claim 30, Tanaka *et al.* disclosed an illumination system that comprises: an optical element (103) having a plurality of raster elements (109) arranged on a support structure in a plurality of rows, wherein at least one of the plurality of rows includes at least two of the plurality of raster elements, wherein the raster elements each has a height and a width with an aspect ratio, and wherein at least two of the raster elements (109A or 109B, 109) have aspect ratio of different magnitude (column 8, lines 11-19), wherein the illumination system produces a two-dimensional image of the raster elements in an object plane.

7. Claims 21, 25, and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Koch *et al.* (U. S. Patent No. 6,195,201 B1).

With regard to claim 21, Koch *et al.* disclosed an illumination system that comprises: an optical element (16) having a plurality of raster elements (42) arranged in a plurality of rows on a support structure (41), wherein at least one of the plurality of rows includes at least two of the plurality of raster elements, wherein the plurality of raster elements includes a first raster element and a second raster element that are different sizes (different thickness, *inter alia*), and wherein the first raster element is a first mirror and the second raster element is a second mirror, wherein the illumination system defines a field to be illuminated in an object plane of the illumination

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system, wherein the field represents a segment of a ring field (column 6, line 58-61), and wherein the illumination system produces a two-dimensional image of the raster elements in the object plane.

With regard to claim 25, Koch *et al.* disclosed the illumination system according to claim 21, wherein the support structure is a raster element plate (41).

With regard to claim 26, Koch *et al.* disclosed an illumination system that comprises: an optical element (16) having a plurality of raster elements (42) arranged in a plurality of rows, wherein at least one of the plurality of rows includes at least two of the plurality of raster elements, wherein the plurality of raster elements includes a first raster element and a second raster element that are different sizes (different thickness, *inter alia*), and wherein the first raster element is a first mirror and the second raster element is a second mirror, wherein the illumination system defines a field to be illuminated in an object plane of the illumination system, wherein the field represents a segment of a ring field (column 6, line 58-61), and wherein the illumination system produces a two-dimensional image of the raster elements in the object plane.

Allowable Subject Matter

8. Claims 3-8, 12, and 14-16 are allowed.
9. Claim 19 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
10. The following is a statement of reasons for the indication of allowable subject matter:

With regard to claims 3-8 and 12, the prior art discloses illumination systems for lithography with wavelengths ≤ 193 nm that comprises: (a) a first optical element, which is divided into first raster elements and lies in a first plane, wherein the first plane defines an x-direction and a y-direction, wherein the first raster elements each has an x-dimension and a y-dimension with an aspect ratio, and wherein at least two of the first raster elements have different aspect ratios; and (b) a second optical element, which is divided into second raster elements, wherein each of the second raster elements is in a light path from a corresponding one of the first raster elements. However, the prior art fails to teach or fairly suggest that at least some of the second raster elements have an anamorphic optical effect such that an aspect ratio of images of the first raster elements is substantially the same in an object plane independent of the aspect ratio of the first raster elements as claimed.

With regard to claim 14, the prior art discloses an illumination system for lithography with wavelength of ≤ 193 nm that comprises: a first optical element, which is divided into first raster elements and lies in a first plane, wherein the first raster elements each has an x-dimension and a y-dimension with an aspect ratio, wherein the first raster elements are arranged on a support structure in a plurality of rows, wherein at least one of the plurality of rows includes at least two of the first raster elements, wherein the illumination system defines a field to be illuminated in an object plane of the illumination system, wherein the field represents a segment of a ring field, wherein the first raster elements are mirrors, and wherein the illumination system produces a two-dimensional image of the first raster elements in the object plane. However, the prior art fails to disclose a first optical element, which is divided into first raster elements, and

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wherein at least two of the first raster elements have aspect ratios of different magnitude as claimed.

With regard to claims 15 and 16, the prior art discloses a projection exposure system for microlithography comprising: (a) an illumination system for lithography with wavelength of ≤ 193 nm having: a first optical element, which is divided into first raster elements and lies in a first plane, wherein the first raster elements each has an x-dimension and a y-dimension with an aspect ratio, wherein the first raster elements are arranged on a support structure in a plurality of rows, wherein at least one of the plurality of rows includes at least two of the first raster elements, wherein the first raster elements are mirrors, and wherein the illumination system produces a two-dimensional image of the first raster elements in an object plane; and an exit pupil; (b) a pattern-bearing mask situated in the object plane; (c) a projection device, with an entrance pupil, which coincides with the exit pupil of the illumination system, wherein the projection device images a illuminated portion of the pattern-bearing mask in an image field of the projection device; and (d) a light-sensitive substrate situated in a plane in which the image field is situated. However, the prior art fails to disclose a first optical element, which is divided into first raster elements, wherein at least two of the first raster elements have aspect ratios of different magnitude as claimed.

With regard to claim 19, the prior art discloses the illumination system according to claim 9, the illumination system further comprises a second optical element, which is divided into second raster elements, wherein each of the second raster elements is in a light path from a corresponding one of the first raster elements. However, the prior art fails to disclose an

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illumination system that comprises at least one second raster element that has an anamorphic optical effect as claimed.

With regard to claims 20 and 24, the prior art discloses an illumination system that comprises: an optical element having a plurality of raster elements arranged in a plurality of rows on a support structure, wherein at least one of the plurality of rows includes at least two of the plurality of raster elements, wherein the plurality of raster elements includes a first raster element having a first aspect ratio and a second raster element having a second aspect ratio, wherein the first raster element is a first mirror and the second raster element is a second mirror, wherein the illumination system defines a field to be illuminated in an object plane of the illumination system, wherein the field represents a segment of a ring field, and wherein the illumination system produces a two-dimensional image of the raster elements in the object plane. However, the prior art fails to disclose an optical element having a plurality of raster elements, wherein the plurality of raster elements includes a first raster element having a first aspect ratio and a second raster element having a second aspect ratio, and wherein the first aspect ratio is not equal to the second aspect ratio as claimed.

Response to Amendment

11. Applicants' amendments filed 13 August 2007 with respect to claims 3, 14, and 15 have been fully considered. The objection of claims 3, 14, and 15 has been withdrawn.

12. Applicants' amendments filed 13 August 2007 with respect to claims 3-8, 12, and 19 have been fully considered. The rejection of claims 3-8, 12, and 19 under 35 U.S.C. 112, second paragraph, has been withdrawn.

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13. Applicants' amendments filed 13 August 2007 with respect to claims 9-11, 13-16, 20, 21, and 24-26 have been fully considered. The rejection of claims 9-11, 13-16, 20, 21, and 24-26 under 35 U.S.C. 102(b) as being anticipated by Oshino (U. S. Patent No. 5,677,939) has been withdrawn.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- (1) Miyake *et al.* (U. S. Patent No. 5,896,438) disclosed an optical element (**508**) that is divided into a plurality of raster elements, wherein the raster elements are arranged on a support structure in a plurality of rows, and wherein at least one of the plurality of rows includes at least two of the raster elements.
- (2) Miyake *et al.* (U. S. Patent No. 6,504,896 B2) disclosed an optical element (**1005**) that is divided into a plurality of raster elements, wherein the raster elements are arranged on a support structure in a plurality of rows, and wherein at least one of the plurality of rows includes at least two of the raster elements.

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after

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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 9:00 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Allen C. Ho/
Primary Examiner
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24 October 2007